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FOREIGN SCIENCE AND ENGINEERING STUDENTS IN THE UNITED STATES

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In 2008, about 568,000 foreign students (those holding temporary visas) studied at U.S. universities and colleges, 248,000 of them in science and engineering (S&E). There was an expectation (ACE 2009; Fackler 2009; IIE 2009) that fall 2009 foreign enrollments might be negatively affected by the 2008–09 world financial crisis because of schools' restrictions on enrollment, declines in institutional funds available for graduate student financial support, and declines in the value of foreign home currencies compared to the U.S. dollar, as well as the price of education in the United States compared to other countries and the increased capacity for education in the home countries. A recent report from the Council of Graduate Schools showed no increase from fall 2008 to fall 2009 in first-time foreign graduate enrollment and only a slight increase in overall foreign graduate enrollment after several years of double-digit increases (CGS 2009).

This InfoBrief addresses trends in foreign enrollment at all levels in S&E fields as well as in all fields in U.S. institutions of higher education through fall 2009. Using data from the U.S. Immigration and Customs Enforcement's Student and Exchange Visitor Information System (SEVIS), this InfoBrief examines changes in S&E enrollment by level, field, and country of origin from fall 2006 to fall 2009.

Foreign Enrollment by Field

Foreign enrollment in U.S. universities and colleges increased by 3% in fall 2009 to 586,000, rising 2% for non-S&E fields (to 327,000) and 4% for science and engineering (to 259,000) (table 1). The increase in S&E enrollment was larger than in recent years, but for the 2006–09 period, S&E students accounted for a steady 44% of total foreign enrollment.

A non-S&E field, business, accounted for the largest number of foreign students (143,000). Among S&E fields, engineering and computer sciences were the two largest fields enrolling foreign students. Engineering (99,000) accounted for 17% of foreign students in fall 2009, and computer sciences (43,000) accounted for another 7%. Foreign enrollment rose in 2009 in all S&E fields except psychology; mathematics and economics showed the greatest percentage gains.

Foreign Enrollment by Level

Although about equal numbers of all foreign students are in undergraduate and graduate programs, graduate students far outnumber undergraduates (172,000 versus 87,000, respectively) among S&E students. From fall 2008 to fall 2009, graduate S&E enrollment rose 3% to approximately 172,000 students (table 2). Most of this increase occurred among master's degree students. Enrollment of new foreign graduate students in S&E programs dropped 2% from 2008 to 2009, suggesting smaller increases in overall foreign enrollment in years to come. In non-S&E graduate programs, overall foreign student enrollment rose 1% in 2009, and enrollment of new foreign students remained about the same as in 2008.

Information and data from the Division of Science Resources Statistics are available on the web at http://www.nsf.gov/statistics/.
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TABLE 1. Foreign students enrolled in U.S. higher education institutions, by field: 2006–09

Field	Number				% change		
	2006	2007	2008	2009	2006–07	2007–08	2008–09
All fields	525,470	548,090	568,400	585,530	4.3	3.7	3.0
Science and engineering	232,780	240,130	248,260	258,950	3.2	3.4	4.3
Agricultural sciences	4,820	4,990	5,060	5,280	3.5	1.4	4.3
Biological sciences	29,600	30,730	31,370	31,530	3.8	2.1	0.5
Computer sciences	39,370	40,220	41,540	42,640	2.2	3.3	2.6
Economics	13,340	13,980	14,870	16,250	4.8	6.4	9.3
Engineering	84,320	88,030	92,900	98,910	4.4	5.5	6.5
Mathematics	10,810	11,190	11,990	13,230	3.5	7.1	10.3
Physical sciences	21,770	21,840	21,850	22,230	0.3	0.0	1.7
Psychology	8,780	8,730	8,560	8,530	-0.6	-1.9	-0.4
Other social sciences	19,980	20,440	20,110	20,340	2.3	-1.6	1.1
Non-S&E	292,680	307,960	320,130	326,590	5.2	4.0	2.0
Business	120,570	130,030	139,440	143,380	7.8	7.2	2.8
Education	21,410	21,500	20,640	19,630	0.4	-4.0	-4.9
Health	27,270	29,450	30,550	31,160	8.0	3.7	2.0
Humanities	45,880	46,630	46,000	45,950	1.6	-1.4	-0.1
Other non-S&E	77,570	80,360	83,500	86,460	3.6	3.9	3.5

S&E = science and engineering.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding. Percentages based on unrounded numbers.

SOURCE: Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System database, special tabulations: 2010.

TABLE 2. S&E and non-S&E foreign students enrolled in U.S. higher education institutions, by academic level: 2006–09

Level	All fields				S&E				Non-S&E			
	2006	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009
Total enrollment												
All levels	525,470	548,090	568,400	585,530	232,780	240,130	248,260	258,950	292,680	307,960	320,130	326,590
Undergraduate	256,090	266,870	281,550	291,460	74,740	77,150	81,700	86,790	181,340	189,730	199,850	204,670
Associate's	68,170	74,060	78,560	77,220	10,380	11,270	12,080	12,040	57,790	62,790	66,480	65,180
Bachelor's	187,910	192,820	203,000	214,240	64,360	65,880	69,620	74,750	123,550	126,930	133,370	139,490
Graduate	269,380	281,210	286,840	294,080	158,040	162,980	166,560	172,160	111,340	118,230	120,280	121,920
Master's	153,190	166,210	174,370	179,240	69,550	75,650	81,440	85,110	83,650	90,560	92,930	94,130
Doctorate	116,190	115,010	112,470	114,840	88,490	87,340	85,120	87,050	27,690	27,670	27,350	27,800
New enrollment												
All levels	136,360	147,560	159,520	159,560	54,520	59,220	63,490	63,620	81,840	88,340	96,030	95,940
Undergraduate	68,050	73,050	82,520	83,600	17,570	19,000	21,960	22,980	50,480	54,060	60,560	60,630
Associate's	20,380	21,620	23,380	21,670	3,030	3,280	3,520	3,330	17,350	18,340	19,850	18,340
Bachelor's	47,670	51,430	59,140	61,940	14,540	15,720	18,440	19,650	33,130	35,720	40,700	42,290
Graduate	68,310	74,510	77,000	75,960	36,950	40,230	41,530	40,650	31,360	34,280	35,470	35,310
Master's	48,930	54,580	56,680	54,770	22,600	25,580	26,550	24,810	26,340	29,000	30,130	29,960
Doctorate	19,380	19,930	20,320	21,190	14,360	14,640	14,980	15,840	5,020	5,290	5,340	5,350

S&E = science and engineering.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding.

SOURCE: Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System database, special tabulations: 2010.

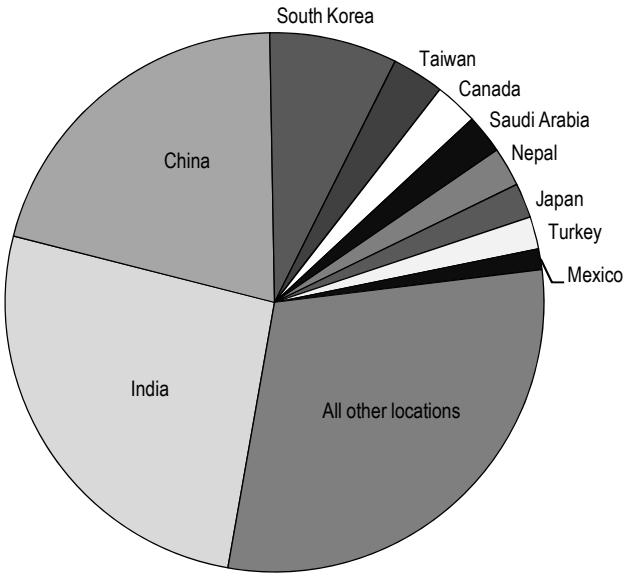
The number of foreign students enrolled in undergraduate S&E degree programs in U.S. academic institutions rose 6% to approximately 87,000 students between fall 2008 and fall 2009 (table 2). All of this increase was in bachelor's degree programs. In non-S&E programs, the number of foreign undergraduates increased 2%. In contrast to the trends among new graduate students, the number of new foreign undergraduates enrolled in S&E programs increased 5% from fall 2008 to fall 2009, although the gain was substantially smaller than the 16% increase from fall 2007 to fall 2008.

Foreign Enrollment by Country of Citizenship

India, China, and South Korea are the top countries of citizenship of foreign students in the United States in S&E and in non-S&E fields. In addition, Saudi Arabia, Nepal, Japan, Turkey, Mexico, Canada, and Taiwan are among the top 10 countries/economies of citizenship of foreign S&E students in the United States (figure 1). Two countries—India, with 68,000 S&E students, and China, with 54,000—accounted for almost half (47%) of all foreign S&E students in the United States in December 2009.

Foreign student enrollment from 6 of the top 10 countries/economies of citizenship decreased in 2009, and new student enrollment from 7 of the top 10 countries/economies decreased as well. Overall S&E enrollment from India and from China increased in 2009, but the situation among new S&E students was more mixed: enrollment of new S&E students from India declined 17%, but enrollment of new S&E students from China increased 25%. Overall S&E enrollment and enrollment of new S&E students from South Korea were about the same in 2009 as in 2008 (table 3). In addition, S&E enrollment in the United States increased from the Middle East (notably Saudi Arabia and Iran) and Africa but decreased from Europe, Central and South America, and Canada.

FIGURE 1. Foreign S&E students enrolled in U.S. higher education institutions, by country of citizenship: Fall 2009



S&E = science and engineering.

SOURCE: Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System database, special tabulations: 2010.

TABLE 3. Foreign science and engineering students in U.S. higher education institutions, by region and selected country/economy: Fall 2006–fall 2009

Region/country/economy of citizenship	Overall enrollment				New enrollment			
	2006	2007	2008	2009	2006	2007	2008	2009
All regions/countries/economies	232,780	240,130	248,260	258,950	54,520	59,220	63,490	63,620
Asia	157,170	164,750	173,780	183,440	38,190	42,660	46,500	46,100
Bangladesh	1,390	1,320	1,370	1,560	250	290	390	450
China	38,960	41,450	45,620	53,740	8,440	10,670	12,960	16,200
Hong Kong	2,410	2,240	2,090	2,170	520	520	600	600
India	56,280	61,430	65,960	67,800	15,860	17,860	18,280	15,130
Indonesia	2,580	2,330	2,200	2,090	470	460	520	520
Japan	8,570	7,560	6,340	5,370	1,640	1,400	1,200	1,030
Malaysia	2,840	2,840	2,950	3,100	520	580	590	770
Nepal	4,060	4,830	6,050	6,080	1,390	1,500	2,080	1,350
Pakistan	2,430	2,200	1,980	1,910	480	430	390	410
Philippines	970	1,010	1,020	940	190	210	210	150
Singapore	1,480	1,410	1,360	1,410	350	360	340	380
South Korea	18,660	19,410	19,900	19,850	4,250	4,620	4,950	4,940
Sri Lanka	1,480	1,640	1,820	1,880	350	390	440	360
Taiwan	9,000	8,630	8,220	8,120	1,990	1,790	1,780	1,920
Thailand	2,390	2,280	2,140	2,130	410	450	490	490
Vietnam	1,850	2,260	2,770	3,150	560	660	770	820
Middle East	14,430	15,890	16,780	18,550	3,160	3,800	3,750	4,320
Iran	1,630	1,850	2,210	3,160	390	460	550	970
Israel	850	760	700	660	170	120	170	130
Jordan	870	890	920	930	170	200	200	190
Lebanon	1,010	910	850	780	210	180	190	160
Saudi Arabia	3,150	4,550	5,230	6,080	790	1,380	1,120	1,340
Turkey	5,430	5,400	5,160	5,010	1,110	1,120	1,090	1,080
Europe	20,700	19,650	18,630	17,900	4,530	4,360	4,480	4,300
Bulgaria	1,350	1,220	1,040	900	240	200	170	160
France	1,740	1,690	1,630	1,600	460	460	470	510
Germany	2,030	2,080	2,070	1,980	620	580	600	520
Greece	980	890	850	840	180	160	180	190
Italy	1,100	1,120	1,150	1,210	240	250	300	280
Poland	910	870	790	690	160	160	160	110
Romania	1,430	1,260	1,080	950	200	190	170	120
Russia	1,620	1,500	1,410	1,370	300	280	280	290
Spain	780	770	750	750	180	200	230	220
Ukraine	700	660	600	570	90	110	100	120
United Kingdom	1,970	1,860	1,800	1,790	470	470	440	470
Africa	13,290	13,060	13,070	13,670	2,740	2,790	3,020	3,280
Egypt	710	730	730	790	170	150	160	170
Ethiopia	590	620	760	830	100	180	220	200
Ghana	1,260	1,210	1,260	1,210	220	290	320	270
Kenya	2,310	2,050	1,930	1,770	520	390	450	360
Nigeria	2,780	2,750	2,680	2,830	520	540	600	700
Central and South America	18,970	18,610	18,070	17,560	3,980	3,660	3,700	3,700
Argentina	880	780	690	590	160	90	110	110
Bahamas	790	740	760	760	180	180	210	190
Brazil	1,540	1,600	1,710	1,780	340	340	410	410
Colombia	2,140	2,130	2,080	2,060	400	430	400	420
Ecuador	710	670	650	620	160	130	130	130
Jamaica	1,520	1,480	1,380	1,270	330	290	270	250
Mexico	3,190	3,270	3,280	3,260	780	690	730	700
Peru	1,110	1,070	1,000	910	200	190	170	170
Trinidad and Tobago	1,380	1,260	1,120	990	280	220	210	190
Venezuela	1,270	1,190	1,150	1,150	230	230	220	230
North America	7,130	7,010	6,890	6,820	1,700	1,660	1,790	1,690
Canada	6,960	6,860	6,740	6,690	1,660	1,630	1,750	1,650
Oceania	1,060	1,070	1,010	990	210	240	240	240
Australia	600	620	600	610	130	170	160	170
Unknown	30	80	30	20	0	60	0	0

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding and because regions include countries not shown separately.

SOURCE: Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System database, special tabulations: 2010.

Level of enrollment and fields of study differ by country of citizenship. Two of the top three countries—India and China—send far more S&E than non-S&E students and more graduate students than undergraduate students to the United States (table 4). More than half of the students from India study engineering or computer sciences, mostly at the master's level. Almost half of the students from China study either business or engineering. Most Chinese business students (96%) are enrolled in undergraduate or master's programs,

TABLE 4. Foreign students enrolled in U.S. higher education institutions, by academic level, top country of citizenship, and field: Fall 2009

		S&E							Non-S&E					
Level and country	All fields	S&E total	Agricultural and biological sciences	Computer sciences	Economics	Engineering	Mathematics and physical sciences	Psychology and other social sciences	Non-S&E total	Business	Education	Health	Humanities	Other non-S&E
All levels	585,530	258,950	36,810	42,640	16,250	98,910	35,460	28,870	326,590	143,380	19,630	31,160	45,950	86,460
India	94,300	67,800	7,090	18,840	930	35,300	4,280	1,360	26,500	14,590	600	5,010	1,290	5,010
China	102,190	53,740	7,770	5,930	4,490	19,200	13,160	3,200	48,450	29,250	2,260	2,080	3,310	11,550
South Korea	64,150	19,850	3,280	1,930	2,100	6,270	2,710	3,560	44,300	12,670	2,890	4,230	12,100	12,420
Taiwan	22,350	8,120	1,470	980	450	3,170	1,090	960	14,230	6,350	1,430	960	2,590	2,910
Canada	26,830	6,690	1,620	320	410	1,460	760	2,110	20,150	4,010	3,640	3,260	3,610	5,630
Saudi Arabia	12,650	6,080	220	1,680	130	3,470	340	230	6,570	3,870	310	470	160	1,760
Nepal	13,060	6,080	1,440	1,490	220	1,640	930	360	6,980	3,990	70	1,120	160	1,650
Japan	20,430	5,370	940	400	550	610	580	2,290	15,060	4,970	1,210	760	2,860	5,270
Turkey	9,460	5,010	330	690	510	2,010	540	940	4,450	2,430	230	80	560	1,160
Mexico	9,200	3,260	450	280	180	1,420	360	570	5,940	2,300	420	280	1,200	1,750
Undergraduate	291,460	86,790	13,930	13,110	8,980	28,240	8,760	13,780	204,670	90,700	7,910	16,530	24,580	64,950
China	38,340	11,320	1,190	1,280	2,150	3,530	2,180	1,000	27,020	17,070	350	720	1,520	7,360
South Korea	39,100	9,740	2,070	970	1,430	2,260	1,190	1,820	29,360	9,970	910	2,490	6,300	9,700
India	12,800	6,400	740	1,320	420	3,320	270	330	6,400	3,040	80	690	510	2,070
Saudi Arabia	9,430	4,760	120	1,320	70	2,940	210	100	4,670	2,910	40	210	100	1,420
Nepal	9,440	3,860	1,080	990	110	1,050	410	220	5,580	2,990	40	980	110	1,450
Canada	15,590	3,570	1,020	160	300	830	320	950	12,020	2,940	1,760	1,230	1,890	4,200
Japan	15,310	3,310	610	300	340	310	300	1,430	12,010	4,120	740	470	2,180	4,500
Malaysia	3,870	2,390	470	100	110	970	550	200	1,480	540	30	110	160	650
Vietnam	10,810	2,330	410	630	230	610	290	150	8,480	5,090	80	780	350	2,190
Nigeria	3,700	1,800	400	250	170	720	120	150	1,890	630	30	560	80	600
Master's	179,240	85,110	6,050	22,880	2,480	40,300	5,810	7,600	94,130	48,780	7,840	7,840	13,360	16,310
India	64,770	47,170	2,750	16,270	140	26,290	1,210	500	17,610	11,150	380	3,070	460	2,560
China	30,100	12,930	1,030	2,240	1,040	5,100	2,290	1,220	17,170	10,920	1,200	510	1,300	3,250
Taiwan	9,690	2,640	240	520	100	1,240	200	340	7,050	3,890	720	350	1,070	1,030
South Korea	12,280	2,570	140	440	140	910	280	670	9,700	2,120	1,110	890	3,990	1,590
Nepal	2,590	1,300	160	460	50	430	110	100	1,290	970	20	110	20	170
Saudi Arabia	2,620	1,010	70	320	40	380	90	110	1,610	940	200	150	50	280
Canada	6,080	1,000	150	70	30	210	70	470	5,080	970	1,760	650	880	820
Japan	3,410	920	90	70	40	130	70	520	2,490	840	360	180	470	650
Turkey	2,400	860	30	130	80	380	60	190	1,530	1,080	80	20	120	230
Thailand	3,340	800	40	250	40	330	40	90	2,540	1,880	80	60	150	380
Doctorate	114,840	87,050	16,830	6,650	4,800	30,380	20,900	7,490	27,800	3,890	3,890	6,780	8,020	5,210
China	33,750	29,490	5,550	2,410	1,300	10,570	8,680	980	4,260	1,260	710	850	490	940
India	16,730	14,230	3,600	1,250	370	5,690	2,800	530	2,490	390	150	1,240	320	390
South Korea	12,780	7,540	1,080	520	530	3,100	1,240	1,070	5,240	580	870	860	1,810	1,130
Taiwan	5,940	3,880	930	220	150	1,480	700	400	2,050	270	600	380	490	320
Turkey	3,240	2,620	250	210	280	980	440	460	620	200	100	20	180	130
Iran	2,680	2,500	90	210	60	1,830	270	50	180	60	10	50	20	50
Canada	5,170	2,120	460	90	80	430	380	690	3,050	100	120	1,380	840	610
Japan	1,710	1,140	240	30	160	160	210	340	570	20	120	110	210	110
Germany	1,450	990	210	70	100	150	250	210	470	50	20	50	290	50
Nepal	1,030	920	200	40	60	160	410	50	110	20	10	30	20	30

S&E = science and engineering.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding. Countries ordered by number of S&E students.

SOURCE: Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System database, special tabulations: 2010.

and more than half of Chinese engineering students are enrolled in doctoral programs.

In contrast, South Korea sends far more non-S&E than S&E students and more undergraduate than graduate students. More than two-thirds of the students from South Korea are enrolled in non-S&E fields. Business and humanities account for the largest numbers of South Koreans in non-S&E fields, and engineering accounts for the largest number of South Koreans enrolled in S&E fields.

Mobility of Foreign Students

A sizeable number of foreign students (about 10,000) coming to the United States to study may have previously migrated from their native country. Four percent of foreign S&E students in U.S. universities are citizens of countries in which they were not born. Canada, India, and the United Kingdom send the largest numbers of nonnative-born citizens to study S&E in the United States (table 5). Of the approximately 7,000 Canadian citizen S&E students in the United States in fall 2008, 30% (or about 2,000 students) were not born in Canada; more than half of them were born in Asia—about 500 in China, 200 in Hong Kong, 200 in Taiwan, and more than 100 each in India and South Korea. The United Kingdom also sends a relatively large fraction (30%) of students who are not native-born; of these, the largest number were born in Hong Kong. Only a small percentage (2%) of Indian students in the United States were not born in India; however, because the number of students from India is so large, the number of nonnative-born students from India who come to study in the United States is also large. Countries of birth for Indian citizens in the United States include the United Arab Emirates, Kuwait, Saudi Arabia, Bahrain, and Oman.

Summary

Confirming expectations and recent findings from the Council of Graduate Schools, the SEVIS data on foreign enrollment in U.S. institutions showed slowing growth in foreign enrollment in fall 2009 and no increase in enrollment of first-time foreign students. Despite the drop in new students from many countries, especially India, foreign enrollment in S&E fields continued to increase in fall 2009, with increases primarily from China and Middle Eastern countries. Continued weakness in the U.S. and global economies and long-term budget woes in states and universities (Federal Reserve 2009; Nelson 2010) may affect the number of new foreign students coming to the United States to study over the next several years.

TABLE 5. Top countries/economies of birth for students from Canada, India, and the United Kingdom enrolled in S&E programs in U.S. higher education institutions: Fall 2009

Country/economy of birth	Canada	Country/economy of birth	India	Country/economy of birth	United Kingdom
All S&E students	6,690	All S&E students	67,800	All S&E students	1,790
Native students	4,710	Native students	66,730	Native students	1,240
Nonnative students	1,980	Nonnative students	1,070	Nonnative students	540
China	460	United Arab Emirates	250	Hong Kong	240
Hong Kong	200	Kuwait	190	All other countries	300
Taiwan	190	Saudi Arabia	120		
South Korea	150	Bahrain	60		
India	140	Oman	50		
Iran	80	All other countries	400		
Pakistan	50				
Russia	40				
United Kingdom	40				
Poland	40				
All other countries	590				

S&E = science and engineering.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding.

SOURCE: Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System database, special tabulations: 2010.

Data Sources and Limitations

The data in this InfoBrief are from the U.S. Immigration and Customs Enforcement's SEVIS database. SEVIS maintains information on foreign nationals who are students and exchange visitors under F, M, or J visas. Fall 2009 data in this InfoBrief refer only to active foreign national students in the United States enrolled in U.S. colleges or universities as of 6 December 2009, including those on Optional Practical Training (temporary employment directly related to the student's major area of study either during or after completion of the degree program). The data do not include exchange visitors, students enrolled in primary or secondary schools, flight training programs, language training programs, vocational programs, or "other" programs (including certificate and other non-degree programs). The reference dates for the fall 2006, 2007, and 2008 data are 21 November 2006; 21 November 2007; and 18 November 2008, respectively.

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Notes

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